PUBLIC HEALTH REPORTS

VOL. XXVIII. DECEMBER 26, 1913. No. 52.

TUBERCULOSIS IN SWITZERLAND.

RESULTS OF THE CAMPAIGN AGAINST THE DISEASE.

A résumé of the translation of an article appearing in The Bulletin of the International Office of Public Hygiene, Paris (Tome V, No. 10, p. 1739–1758, Oct., 1913), under the title "L'État Actuel de la Lutte Contre la Tuberculose en Swisse," by M. le Dr. F. Schnud, Director of the Swiss Federal Sanitary Service, the Delegate of Switzerland in the Committee of the International Office of Public Hygiene.

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Researches undertaken toward the sixtieth year of the last century into the mortality from pulmonary tuberculosis in Switzerland did not give a single practical result. It was only after the discovery of the tubercle bacillus, the proof of the transmissibility of tuberculosis, and the success obtained by treatment in the open air, especially in stations of high altitude, that it was possible to establish a practical campaign against this infection.

In 1891 the Swiss Society of Public Utility named a commission to study methods to overcome tuberculosis. This commission was able to inform the public, with the assistance of pamphlets, of the advantages of treatment in sanatoria. A guide was published by the commission for the establishment of sanatoria, especially for the tubercular poor. In 1891, at the time of the celebration commemorating the foundation of the city of Berne, it was decided to create a municipal tuberculosis hospital.

The following sanatoria have been established:

Sanatorium.	Place established.	Year.	Elevation.
			Meters.
Berne	Heiligenschwendi	1895	1,180
Basel	Davos	1895	1,600
Glaronnais	Braunwald	1898	1,200
Zurich Canton	Wald	1899	900
Neuchatel Canton	Malvilliers	1903	860
Vaud Canton	Leysin	.....	1,450
Children's Sanatorium	....do	.....	1,450
Genevese Sanatorium	Clairmont	1903	1,460
St. Gall	Knoblisbuhl	1909	1,000
Soleure	Allerheiligen	1910	900
Argovie	Barmelweid	1912	774
Zoug	Aegeri	1912	860

The public sanatoria have been greatly enlarged during recent years, particularly those of Wald and Heiligenschwendi. New buildings were built at Arosa for the Canton of Grisons, at Scienes on the Albenna for the Canton of Fribourg, so they will have 1,000 to 1,200 beds, or one bed for every 3,000 inhabitants. The annual running expenses of these 12 public sanatoria, containing about 1,000 beds each, was, in round numbers, about 6,000,000 or 7,000,000 francs, an average of 6,000 to 7,000 francs per bed.

It was found that the expenses were met mostly by voluntary contributions and gifts and that the public resources contributed only a small part.

This means of procuring necessary funds for construction necessitated a close economy. No hygienic measures were neglected, but every kind of luxury was avoided.

In the seven years that elapsed between 1905 and 1911, in the neighborhood of 12,000 cases were cared for in these public sanatoria.

The following figures show the results following the treatment of the sick who were discharged from 1905 to 1911 from the Swiss public sanatoria after being under treatment in them for more than four weeks:

	First stage.	Second stage.	Third stage.	Average.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Improved	96.7	86.6	62.6	82.7
Unimproved	3.2	12.4	34.4	16.0
Died in sanatoria	.1	1.0	3.0	1.3

On the basis of 100 cases treated there were—

37.7 in the first stage of the disease.
30.1 in the second stage of the disease.
32.2 in the third stage of the disease.

The following figures illustrate the immediate economic results obtained in those cases treated (not including children) in the same space of time. It also shows the capacity for work after leaving the sanatorium.

Capacity for work.	First stage.	Second stage.	Third. stage.	Average.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Able to perform hard work	86.7	58.9	25.6	58.0
Able to perform light work	10.3	28.5	34.8	23.9
Able to perform only very light work	2.0	11.5	36.6	16.7
Died in sanatorium	.1	1.0	3.0	1.4

The three public sanatoria of Heiligenschwendi, Davos, and Wald have during several years carried on investigations as to the permancy of the treatment in the last 11 years. These are the results of this investigation, reported in terms of 100 cases:

Stage.	Condition.	After a stay in the sanatorium of—			
		One year.	Three years.	Six years.	Nine years.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
First	Able to work	98.5	88.1	84.9	80.3
First	Unable to work	1.1	4.5	4.1	6.0
First	Died	.4	7.4	11.0	13.7
Second	Able to work	88.2	81.5	45.4	32.5
Second	Unable to work	3.3	2.6	8.8	5.3
Second	Died	3.5	15.9	45.8	62.2
Third	Able to work	37.0	25.2	15.7	6.1
Third	Unable to work	11.1	8.5	4.2	2.4
Third	Died	51.9	66.3	80.1	91.5
Three stages together	Able to work	77.4	62.2	50.2	35.3
	Unable to work	4.7	5.4	5.6	4.4
	Died	17.9	32.4	44.2	60.3

In 1905 Dr. Burckhardt, of Basel, compared the uniform results obtained in pulmonary tuberculosis cases of the same age and situated in the same surroundings in the Basel polyclinic with those who were cured in the public sanatoria treated in a different way, with or without open-air treatment, in the neighborhood of Basel. The following are the results of this comparison:

Condition.	End of three years.		End of six years.	
	With treatment in sanatorium.	Without treatment in sanatorium.	With treatment in sanatorium.	Without treatment in sanatorium.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Able to do full work	79	39	58	21
Not able to do part or full work	7	23	7	21
Died	14	33	34	55

It was computed that the frequency of intercurrent diseases was the same in those patients receiving and those not receiving treatment in a sanatorium, but in those that received sanatorium treatment these intercurrent diseases were more rarely fatal, which goes to prove that sanatorium treatment increases the resisting power against disease organisms.

The average length of treatment varied in the Swiss public sanatoria between 80 and 100 days (Heiligenschwendi and Allerheiligen) and 150 to 180 days (Davos, Leysin, Clairmont). Of the remainder, the results both immediate and remote are not generally worse in the sanatoria where the length of treatment is shorter. The expense of the Swiss public sanatoria is generally less. The expense varied

in 1909 from 2 francs 45 per day of treatment at Heiligenschwendi to 4 francs 71 at Malvilliers. These figures might be considered as only slightly higher than those of the German, French, and English sanatoria; only a few of the public sanatoria of Sweden and of Norway are less costly for maintenance.

The Swiss public sanatoria are situated in the Alps and in the Jura at altitudes varying from 800 to 1,600 meters above sea level. Near the public sanatoria there are a number of sanatoria for the well-to-do persons. It should also be added that there are several places having therapeutic springs which have the reputation of being efficacious against tuberculosis. The majority of the sanatoria for the well-to-do are found at Davos (18), at Leysin (7), at Arosa (2); there is at Montana on the Sierre (1) and at Ambri-Piatta (1). Near these institutions, many of the towns below have a great number of free establishments, hotels, and boarding houses, where persons afflicted with pulmonary trouble may obtain open-air treatment.

Among the stations where the waters are of value against pulmonary tuberculosis may be cited those of Weissenburg (Simmenthal, bernese Oberland) and Ternigerbad in Grison Canton.

Between the private and the public sanatoria may be placed those that are open to persons of moderate means. In this respect we might mention those of Erzenberg near Langenbruck in the Jura, and Hartlisberg near Steffisburg on the Thoune. Included in this category are a few foreign sanatoria, mostly at Davos, open to foreigners, such as the German sanatorium at Davos-Wolfgang, the Dutch and English sanatorium at Davos-Platz, and the new German sanatorium under construction at Agra (Tessen).

After the International Association against Tuberculosis was founded in Berlin in 1902, a Swiss national association was founded in the same year, November 22, 1902, with the same object in view, under the title of the Central Swiss Commission for the Campaign against Tuberculosis, and connected itself with the international association. This commission consisted of sanitary authorities, both Federal and cantonal, directors of sanatoria, members of antituberculosis associations, as well as doctors. The object of the commission was to rouse, maintain, and coordinate the antituberculosis movement of Switzerland.

As has been noted many times, it is not sufficient in the control of tuberculosis to rely entirely upon the foundation of sanatoria. Many other institutions are required in this work. The Central Swiss Commission, taking cognizance of this fact, launched a large propaganda in the antituberculosis movement in their country. This propaganda took account of all the measures for the prevention and check of tuberculosis from the youngest age of life and the predisposition to tuberculosis which is met with in certain persons. It included also

the precautions which should be observed, especially those which concern housing, alimentation, bodily hygiene, the prevention of debilitating influences, and the protection of workmen, in order to prevent the appearance of tuberculosis and to combat the malady with success once it has declared itself. The commission considered it to be of utmost importance to educate the general public, and toward this end there was published as a part of this large propaganda a pamphlet, "What shall we do to be saved from tuberculosis?" and a poster, "Prophylaxis of tuberculosis." This poster was placed by the Federal authorities at the disposal of all schools and displayed in a number of public buildings. Wall posters, "Instruction for the prevention of the contagion of tuberculosis in workshops," have been used in a number of factories since 1900 by the Federal factory inspection service.

The commission also put in circulation many popular publications having wide diffusion. Thanks to this free distribution they contributed not a little to the education of the general public.

After the central Swiss commission's program was made known, many of the associations which had been previously founded for erecting and maintaining public sanatoria set themselves to expand their activity along the lines laid down in the program of the central commission. Societies of general interest, and especially the Woman's Association of Public Utility, many sections of the Red Cross, mutual aid and sick benefit societies, included in their program a campaign against tuberculosis, and a number of new associations, cantonal, municipal, and local, were founded to cooperate in the application of the program given above. The results obtained by the activities of the woman's antituberculosis leagues should be noted especially.

In many cities and also in the country, there were created publicity bureaus and dispensaries for the tuberculous and for suspects. These dispensaries provided for the sick the necessary nursing, but allowed them to provide their nourishment and their clothing. They concerned themselves with cleanliness of bedclothes and body, looked after the carrying out of the doctors' orders, such as disinfection of lodgings, the housing of the sick, etc., and finally, above all, they looked after sending children menaced with the disease to the country, where they were placed in charitable institutions and similar establishments.

The actual number of Swiss dispensaries is 120. In the large cities they are regulated and organized on the model of the French and German dispensaries. In cities of less importance and in the country, they depend more for outside help provided by already existing associations whose duty it is to fulfill the duties of the above mentioned dispensaries. It is impossible at this time to give the exact number of persons treated in all the Swiss dispensaries.

The dispensary at Neuchatel has taken up the question of insanitary habitations. As soon as an inspection showed that the lodging of a case of tuberculosis was in an insanitary condition the architect connected with the dispensary was notified. He then went to examine the premises to discover the changes which were necessary and so notified the proprietor, with an order to comply. If this latter direction was unheeded, the sanitary authority of the town was notified.

The first antituberculosis dispensary established in Switzerland was at Neuchatel. Others were founded soon after at Berne, Lausanne, Geneva, Basel, Zurich, St. Gall, and Schaffhouse. In the country they are most numerous in the cantons of Soleure, Zurich, and Basel-Campagne.

In order to prevent infections contracted in hospital and above all to be able to isolate them from their surroundings, efficiently and in time, pavilions for the tuberculous gravely attacked with very severe tuberculosis have been in the course of recent years added to the hospitals in many localities of Switzerland, for example, at Munsterlingen, Geneva, Basel, Bienne, Langnau, Berthoud, and Langenthal. Others are in course of construction; for example, at St. Janier. The entire treatment of the tuberculous is given in the open air. Geneva possesses in the neighborhood of the cantonal hospital a gallery for the air cure which replaces a forest convalescent station.

There has existed since 1903 at Leysin a farm colony attached to the public sanatorium, where cured patients are placed for the time being.

The prevention of tuberculosis in children is carried on in Switzerland by a series of institutions which, thanks to the education which has been developed in the general public, plays an important rôle in carrying out this work. In addition there are a number of dispensaries for infant feeding, day nurseries, and public nurseries. It might be well to cite particularly camps and open-air resorts, which strongly increase the resisting power of debilitated and afflicted children, providing an excellent method for the prevention of tuberculosis.

The work of the open-air camps, founded in 1878 by a philanthropist of Zurich, the pastor Walter Beon, has enjoyed in Switzerland a wonderful favoritism and reputation. In 1912, for example, 10,392 children in 265 camps remained on an average of 204 days. The total expense was 411,290 francs, an average of 40 francs per child and 2 francs per day per child. Certain localities have well-fitted up open-air resorts where children are sent to pass their holidays. During the interval, often during the whole year, these resorts are open to children who require care and who derive benefit from a stay in the country at a proper altitude and with proper diet.

There are also a number of prophylactic institutions playing an important rôle. These are various sanatoria, school sanatoria, resorts, and boarding houses intended to receive debilitated children, the sick and those threatened with tuberculosis. These places are situated in the mountains (Engadine, Davos, Leysin, and other localities) where the double benefit of altitude and sunlight has often brought excellent results, whether in places of moderate elevation (Cantons de Zong, d'Appenzell, de Bale-Campagne, etc.) or upon the plains. In the latter class may be mentioned the establishments adjoining the hot springs (Rheinfelder, Schinznach, Rothenbrunnen, Lavey, etc.), where are other health resorts. Geneva maintains at Cannes upon the Mediterranean an establishment (Dollfuss resort) intended to receive scrofulous and rachitic children, and many cities of Tessin send every year to the border of the Adriatic Sea a certain number of children that require building up. In Switzerland, as elsewhere, it was only after private initiative and after their experience had demonstrated the usefulness of various measures that the public powers undertook the antituberculosis work.

The federal constitution gives to the Confederation the right to legislate on general epidemics. The cantonal and municipal authorities alone may make ordinances looking to the eradication of tuberculosis. A large number of cantons have so far done nothing and rely entirely upon the individual initiative. Others, on the contrary, such as Grison and Berne, have made meritorious efforts in preventing the spread of this disease by legislative measures.

The honor of having been the first municipalities in Switzerland to attack the tuberculosis problem belongs to the civic authorities of Lausanne and Zurich, who in 1895 and 1896 decided that disinfection, which previously had been applied only in the case of infectious diseases, should also be applied to the premises of tuberculous persons after death or upon change of place of residence. They have taken the necessary steps for the disinfection to be done gratuitously in cases of poverty.

In 1897 the Canton of Geneva published instructions upon the dangers of tuberculosis and the methods to be employed in its prevention. In 1900 the municipalities of Davos and Arosa, and in 1903 the municipality of Leysin, made it obligatory to report within 24 hours the death or departure of anyone having tuberculosis, to clean up and disinfect completely the places formerly occupied by tuberculous persons before being occupied again.

The Cantons of Grisons in 1902 and 1904, Neuchatel in 1905, Berne and Zurich in 1907, Thurgovie in 1908, those of Lucerne, Schaffhouse and Glaris in 1909, gave instructions and enacted laws and ordinances relative to tuberculosis. These various regulations required physicians to report active cases of tuberculosis. The disinfection of the

premises of tuberculous persons and the things used by them is obligatory in case of death or change of residence. The bacteriological examination of the excretions of the tubercular poor is facilitated. The cantons contributed a certain proportion of the expenses which were incurred for the community by the application of these measures. It is worth mentioning, particularly, that the Canton of Berne since 1900, the date of the adoption by the people of a law regarding tuberculosis, has done a great deal in preventing the spread of this disease. For example, this Canton provided special tuberculosis services in the district hospitals and has rendered possible the free sanatorium of Berne, which has worked with the other antituberculosis institutions as well as the dispensaries, infant asylums, open-air camps, etc.

Until this time the Confederation, which held no constitutional power in this regard, could not intervene in the campaign against tuberculosis. Still, it took certain measures in preventing bovine tuberculosis. In 1900 the Federal factory inspector published a notice relative to the prevention of tuberculosis in workshops, explaining to laborers the danger of promiscuous spitting and insisted upon cuspidors filled with water.

In 1901 the Federal public health service published instructions relative to the disinfection of buildings with formaldehyde. Later, in 1902, regulations were promulgated providing that in all vehicles and places related to travel (railway cars, tramways, waiting rooms, etc.) notices were to be posted in several languages forbidding spitting. They required the installation of spittoons filled with water in waiting rooms, stations, corridors, etc.

Utilizing the power which was conferred by the Federal law of 1905 for the regulation by ordinances of the commerce of foodstuffs and common things, the Confederation has enacted regulations tending to prevent the spread of tuberculosis by foodstuffs, such as milk, bread, and meat.

The Federal regulation on the commerce of foodstuffs provided that only pure milk might be sold and that all milk obtained from cows afflicted with disease or capable of changing the milk in any way so as to render it harmful to the consumer, such as tuberculosis of the udder, general tuberculosis, etc., should be excluded from sale. Again, it is forbidden in the trade, sale, or handling of milk to employ persons afflicted with a contagious or loathsome disease. The same regulations apply to the making and sale of bread. The local health officers have the power to make sanitary regulations in that which concerns the production, the manipulation, and sale of milk for infants or the sick, and in the manner of caring for the animals which produce it. They also issue instructions for meat inspectors, ordinances for the sale of meat and the products of slaughter-

houses, measures which are necessary to prevent the transmission of tuberculosis by the meat of tuberculous animals.

In view of the partial reduction of tuberculosis and upon the demand of the Swiss Central Antituberculosis Commission, a paragraph has been inserted in the Federal law which has to do with the prevention of disease and accidents. Under this, the Federal authorities may more fully assist those stricken with tuberculosis by allowing them treatment for one year instead of 180 days only.

But the Confederation which was only able to associate itself indirectly with the antituberculosis work was soon able to exercise a direct action. On account of the fact that only a small number of cantons (about one-third) had taken special steps against tuberculosis and that even where certain measures were being taken, the endeavor was full of difficulty resulting from the increased expense which followed, the Federal Assembly instructed the Federal Council in 1909 to find out by what means and in what ways the Confederation could assist in the antituberculosis campaign. In compliance, the Federal Council submitted to the Federal Assembly in November, 1911, a scheme to modify the Federal constitution in the way of augmenting the powers of the Confederation in that which concerned the campaign against the diseases of man and animals. This scheme was adopted by the two councils of the Federal Assembly with very few modifications, and a few months afterwards by the Swiss people themselves. Here is the text of the new constitutional amendment:

The Confederation may take, by legislative means, measures to combat transmissible diseases, wide-spread diseases, and particularly dangerous diseases of man and animals.

The Confederation was thus given the right to legislate not only against general epidemics, as it was in this present case, but also on all transmissible diseases, easily spread and particularly dangerous. It could then, by virtue of the new power which was given it, legislate on that which concerned particularly tuberculosis, enact laws applicable to the whole of Switzerland, and uphold the cantons which had already engaged themselves in the campaign. Under these conditions the promulgation of a Federal law against tuberculosis may be considered as very near.

As may be seen from the foregoing, a great activity in the tuberculosis campaign spread throughout Switzerland. Soon special associations were formed—commissions, women's leagues, mixed leagues—all of which engaged in the campaign. Soon societies of general interest, such as the Woman's Society of Public Utility, sections of the Red Cross, etc., soon associations for the foundation of public sanatoria and lastly the authorities themselves began to take an active hand. Switzerland has actually 30 organizations (associations, leagues, committees, etc.) which occupy themselves exclusively

in the tuberculosis campaign. Besides these there grew at least an equal number of public utility associations, such as the Red Cross, societies aiding the sick, and other beneficiary associations. By conferences, pamphlets, posters, exhibits, etc., these tried to bring about the education of the general public. By dispensaries, societies for the aid of the sick, establishment of municipal infirmaries, etc., means were brought to directly overcome the disease. Lastly, by holiday camps, school kitchens, by sojourn in the country and other means of the same order, methods to promote the resisting power of those susceptible or exposed to the contagion were brought into play. In a word, every method was applied to prevent the spread of the infection. Notwithstanding all the Central Swiss Commission's efforts, it was up to this time impossible to carry on the campaign against tuberculosis in every canton and in all parts of Switzerland. This is the reason why the creation of a permanent central secretary was considered, in which the mission was to make the antituberculosis movement general by having conferences, by having expositions, furnishing information, in centralizing material for study, etc.

If this is obtained, thanks to the attempt of the secretaryship to unify to advantage the organization of the private initiative, hereafter the tuberculosis campaign can be undertaken in places where nothing has been done, and if in other places cantons and confederations carry on the campaign by enactment of appropriate legislation and increased appropriations, we may hope to see the scourge eradicated. At least the efforts up to date have had favorable results. The mortality rate of tuberculosis in Switzerland (including scrofula), as may be seen from statistics, increased on the average during the years 1881 to 1890 to 31 deaths for 10,000 of population. It has subsided since, however, slowly at first, then at the end of 1905 more rapidly to not more than 23 per 10,000 in 1910. If the fact is taken into account that during the first 20 years of the collection of mortality statistics in Switzerland the deaths from tubercular affections other than the pulmonary form were only imperfectly collected, the fall in the tuberculosis mortality in Switzerland during the 20 years from 1890 to 1910 may be computed at about 30 per cent.

The following is the mortality rate from tuberculosis made from complete figures for the last seven quinquennial periods, corrected[1] by calculation and report on the basis of 10,000 inhabitants.

[1] This correction is rendered necessary by the fact that the Swiss statistics specify only the deaths attested by a physician and note all the others under the rubric "Deceased without medical certificate," without other specification (under this head, in 1878, 17.1 of the total deaths were reported, but that proportion has fallen in 1910 to 2.7), by admitting that the proportion of deaths from tuberculosis should be the same among the deaths without medical certificate as among those which are certified by a physician, and by taking into account the differences in the various age classes from the viewpoint of tuberculosis. (See Dr. F. F. Schmid, "The Frequency of Tuberculosis in Switzerland," report of the Congress of Tuberculosis of Berlin, Berlin, 1889, pp. 120-138.)

	Pulmonary tuberculosis.	Other tubercular affections.
1876–1880	22.3	5.0
1881–1885	22.5	6.9
1886–1890	22.5	7.1
1891–1895	20.7	7.5
1896–1900	19.5	7.4
1901–1905	19.0	8.1
1906–1910	17.1	7.2

But it is only since the adoption (in 1901) of a new classification of causes of death that we possess exact statistics on the mortality caused by tubercular affections other than pulmonary tuberculosis. Below are shown the results of these statistics:

	Died from pulmonary tuberculosis, complete figures.	Died from other tubercular affections, including scrofula, complete figures.	Together, complete figures.
1901	19.1	8.3	27.4
1902	18.9	7.9	26.8
1903	18.9	8.0	26.9
1904	19.9	8.2	27.1
1905	19.2	8.2	27.4
1906	18.3	7.3	25.6
1907	17.1	8.0	25.1
1908	17.1	7.0	24.1
1909	16.5	7.1	23.6
1910	16.3	6.8	23.1

It is seen by the preceding tables that the tuberculosis mortality fell in Switzerland during the periods of 1880 to 1910. If in this regard the cities are compared with the country, it is seen that in general the tuberculosis mortality has diminished more rapidly in the former than in the latter, without doubt because the measures against the disease are better applied in the cities. This is shown in the following table, estimated on a basis of 10,000 persons:

Quinquennial period.	Pulmonary tuberculosis.		Other tubercular affections, including scrofula.	
	Cities of more than 10,000 population.	Remaining portion of Switzerland.	Cities of more than 10,000 population.	Remaining portion of Switzerland.
1891–1895	24.8	19.8	.....	.....
1899–1900	23.6	18.5	.....	.....
1901–1905	21.7	18.2	8.2	8.1
1906–1910	18.7	16.5	7.0	7.3
Reduction in per cent	24.6	16.7	14.8	9.8

The mortality rate varied a great deal between one city and another, as is shown in the following table:

Mortality from pulmonary tuberculosis per 10,000 of population.

City.	1891–1895	1906–1910	Reduction.
			Per cent.
Lucerne	21.4	12.6	41
Bale	23.6	15.2	36
Winterthur	23.3	15.5	33
St. Gall	26.3	17.9	32
Zurich	22.2	16.0	28
Berne	28.6	21.3	26
Lausanne	24.7	19.3	21
Fribourg	27.4	21.8	20
Bienne	29.4	23.9	19
Le Locle	15.9	13.1	18
Schaffhouse	19.8	16.6	16
Geneva	30.7	26.8	13
Chaux de Fonds	21.7	19.7	9
Neuchatel	19.8	18.0	9
Herisau	14.1	17.1	(1)

[1] Increased 21 per cent.

The reduction in the pulmonary tuberculosis mortality affects mostly those under 60 years of age. Above 60 years the mortality rate has a tendency to increase. This would seem to prove that pulmonary tuberculosis attacks a more advanced age now than formerly. This statement is based upon the following table, which gives the mortality rate from pulmonary tuberculosis per 10,000 living of each age class:

Groups of ages.	1886–1890	1906–1908	Increased.	Diminished.
			Per cent.	*Per cent.*
Under 1 year	14.6	9.0	.....	38
1 year	10.9	7.3	.....	33
2 to 4 years	5.3	2.8	.....	47
5 to 14 years	5.1	2.8	.....	45
15 to 19 years	20.4	15.5	.....	24
20 to 29 years	33.5	25.6	.....	24
30 to 39 years	35.7	25.6	.....	28
40 to 49 years	31.9	25.1	.....	21
50 to 59 years	30.1	23.3	.....	23
60 to 69 years	29.7	27.7	.....	7
70 to 79 years	19.2	22.7	18	.....
Above 80 years	7.9	10.6	34	.....
Male	23.4	17.3	.....	26
Female	21.9	17.7	.....	19
All groups together	22.5	17.5	.....	22

The brunt of the tuberculosis mortality in Switzerland falls on the first five years of life. This mortality, which in 1901 for 10,000 living of this age group was 29, has fallen in 1908 to 18.4. As is shown in the following table, the forms of the disease took part in this diminution:

Mortality in 10,000 population in group of ages considered.

Location.	1901	1908	Reduction.
			Per cent.
Tuberculosis of brain and meninges	15.2	10.0	34
Pulmonary tuberculosis	7.6	4.3	43
Acute miliary tuberculosis	1.9	1.3	32
Tuberculosis of intestines and peritoneum	2.0	1.1	45
Bone and articular tuberculosis	1.2	.7	42
Other locations, including scrofula	2.5	1.9	24

It being generally recognized that scrofula is a special form of tuberculosis, there is more inclination to classify the deaths of those due to this disease as resulting from tuberculosis. The mortality from scrofula has diminished considerably during the last few years, while the mortality from glandular tuberculosis has increased. In 1881, for example, 218 deaths were registered as being caused by scrofula; this number has fallen to 38 in 1910. Consequently the deaths due to scrofula should always go in with the count when it is necessary to find out the exact tuberculosis mortality rate of a country. The following table shows the mortality rate by the different age classes and sex from pulmonary tuberculosis and other tubercular affections for the years of 1901 to 1908, the mortality being reported on the basis of 10,000 living of each age class:

Age groups.	Male.			Female.			Both.		
	Pulmonary tuberculosis.	Other locations.	Total.	Pulmonary tuberculosis.	Other locations.	Total.	Pulmonary tuberculosis.	Other locations.	Total.
Under 1 year	11.7	31.0	42.7	10.3	26.2	36.5	11.0	28.6	39.6
1 year	7.0	22.1	29.1	7.5	20.9	28.4	7.3	21.6	28.6
2 to 4 years	3.0	12.1	15.1	3.4	12.4	15.8	3.2	12.3	15.5
5 to 14 years	1.9	6.1	8.0	4.6	7.6	12.2	3.2	6.9	10.1
15 to 19 years	10.6	5.5	6.1	23.2	8.4	31.6	16.9	7.0	23.9
20 to 29 years	23.4	5.3	28.7	30.1	6.1	36.2	26.6	5.7	32.3
30 to 39 years	27.2	4.7	31.9	26.1	4.8	30.9	26.7	4.7	31.4
40 to 49 years	31.7	5.6	37.3	20.3	4.8	25.1	25.9	5.2	31.1
50 to 59 years	31.8	6.4	38.2	19.2	5.9	25.1	25.2	6.1	31.3
60 to 69 years	33.4	8.9	42.3	24.5	9.6	34.1	28.6	9.3	37.9
70 to 79 years	23.4	9.3	32.7	21.5	12.4	33.9	22.4	11.0	33.4
80 years and above	12.6	8.8	21.4	7.7	13.3	21.0	9.9	11.3	21.2
All groups together	18.4	7.4	25.8	18.5	8.0	26.5	18.5	7.7	26.2

It is seen that from the fifteenth to the seventy-ninth year deaths from pulmonary tuberculosis predominate, while among children from 0 to 14 years and in the aged of more than 80 years the other tubercular affections caused more deaths. Among children, the deaths from meningeal and brain tuberculosis are most frequent. Among the aged, those caused from bone and articular tuberculosis. At certain ages the tuberculosis mortality rate is slightly higher among

females (26.5 per 10,000) than among males (25.8 per 10,000). At others the mortality rate from pulmonary tuberculosis is practically the same for both sexes (male 18.4, female 18.5, per 10,000). The mortality rate from other tubercular affections is higher among males (7.4 per 10,000).

The mortality from pulmonary tuberculosis of the same age class shows notable differences of one sex from the other. This is shown by the following table, based on 100 tubercular deaths among men and women (from 1901 to 1908):

Age class.	Male.	Female.
0 to 4 years	3.6	3.5
5 to 14 years	2.1	4.8
15 to 19 years	5.6	11.6
20 to 29 years	22.3	27.8
30 to 39 years	20.5	19.3
40 to 49 years	32.0	20.9
60 years and above	13.8	12.0

For the deaths produced from tuberculosis in other parts of the body, the differences between the two sexes is less noticeable.

The influence exercised on the tuberculosis mortality by occupation is shown in the following table, in which the districts of Switzerland are grouped according to the proportion of agricultural population and the tuberculosis mortality:

Average annual mortality per 10,000 population from 1905 to 1909.

Proportion of agricultural population.	Districts.	Pulmonary tuberculosis.	Other forms of tuberculosis.	Total.
0–10 per cent	6	19.1	7.1	26.2
10–20 per cent	23	18.4	7.5	25.9
20–30 per cent	15	18.3	7.6	25.9
30–40 per cent	37	17.7	7.5	25.2
40–50 per cent	34	18.1	7.4	25.5
50–60 per cent	27	15.3	6.9	22.2
60–70 per cent	26	14.7	7.5	22.2
70–80 per cent	7	15.9	6.9	22.8
More than 80 per cent	7	13.2	5.7	18.9
Together	182	17.6	7.4	25.0

It has been a well-known fact for some time that altitude exercises a beneficial effect on tuberculosis. The following statistics prove this statement. The mortality rate is given, by districts, for the period of 1905 to 1909, according to their altitude:

Mortality per 10,000 population.

Altitudes.	Pulmonary tubercu-losis.	Other tubercular affections.	Total.
1. Districts with an altitude less than 200 to 400 meters above the sea....	21.2	7.6	28.8
2. Altitude of 400 to 700 meters above sea level.....	17.3	7.4	24.7
3. Altitude of 700 to 900 meters above sea level.....	16.3	7.2	23.5
4. Altitude of 900 to 1,200 meters above sea level.....	16.4	6.9	23.3
5. Altitude more than 1,200 meters above sea level.....	15.5	5.9	21.4

In reality the number of deaths due to tuberculosis in the higher regions of Switzerland would be less if not raised by the large number of tuberculous persons who, in the hope of prolonging their lives, come from all parts of the country and die in the sanatoria of Davos, Leysen, and Arosa. While it is proper for these persons to do everything to prolong their lives, these deaths should not be charged against the place where they die. If, for example, we consider the district of Oberlandquart, where Davos is situated and where there exists the condition mentioned above, we have not more than in other places having an altitude of 1,200 meters, the mortality being 12 per 10,000 for pulmonary tuberculosis and 17.1 per 10,000 for all forms of tuberculosis.

The mortality from tuberculosis in Switzerland varies naturally a great deal according to place. While, for example, the tuberculosis mortality rate for the whole country averaged for the years 1905 to 1909 25 per 10,000 population, it exceeded 32 per 10,000 in the districts of St. Maurice (32.2), Werdenberg (32.3), Neuveville (32.5), Aigle (33.3), Sargans (33.4), Oberrheinthal (33.8), Oberlandquart (34), Geneva Rive Left (34.4), Porrentruy (36.1), Imboden (Canton of Grisons) (37.8), and in the city of Geneva (39.6). It remained, on the contrary, below 18 per 10,000 in the districts of Pfaffikon (17.4), Reyath (17.3), Etlebuch (16.8), Signau (16.1), Laupen (16), Raron (16), Trachselwad (15.6), Payerne (15.2), Obwalden (14.5), Schleitheim (14.4), Stein (14.1), Viege (13.9), Brigue (13.9), Herens (13.5), Hinterrhein (12.4), Bernina (11.8), and Maloia (11.7).

The differences are most striking if we compare the tuberculosis mortality in the different communities, or still better, if the sections of only one and the same community. The local conditions, and especially those of housing, play a preponderant rôle from the point of view of the frequency of tuberculosis. There is, therefore, a great need in establishing a tuberculosis mortality rate by community and even by sections in that community.